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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,688	10/17/2003	Amarendra Anumakonda	19441-0013	2687

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EXAMINER	
WARTALOWICZ, PAUL A	
ART UNIT	**PAPER NUMBER**
1754	

DATE MAILED: 07/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/605,688	ANUMAKONDA ET AL.	
	Examiner	Art Unit	
	Paul A. Wartalowicz	1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 May 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7-18* is/are pending in the application.

4a) Of the above claim(s) *1-6* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed May 3, 2006 with regard to the restriction requirement have been considered but are moot because the applicant has canceled claims 1-6.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 7-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anumakonda et al. (U.S. 6221280) in view of Wojtowicz et al. (U.S. 2002/0041986) and Isogaya et al. (U.S.4331451).

Anumakonda et al. teach a process for catalytic partial oxidation of hydrocarbon fuel (col. 7, lines 40-44) wherein feeding heavy hydrocarbons such as kerosene are reacted with an oxidizer gas in a partial oxidation reactor in the presence of a noble

metal catalyst at a temperature of about 1050° C (col. 5, lines 25-44) wherein the reaction product gas mixture comprising hydrogen and carbon monoxide (col. 5, lines 45-48) is fed to a solid oxide fuel cell system (fuel cell system inherently teaches producing electric power, col. 7, lines 1-4). Anumakonda et al. fail to teach passing a heat exchange fluid through the shell and past the at least one catalytic partial oxidation reactor with the heat exchange fluid in the shell flowing in the same direction of reactant flow in the catalytic partial oxidation reactor tube such that heat from partial oxidation in the at least one catalytic partial oxidation reactor transfers from the at least one catalytic partial oxidation reactor to the heat exchange fluid in the shell.

Wojtowicz et al. teach a process for producing hydrogen rich gas for use in a fuel cell produced from a hydrocarbonaceous material (paragraph 0019) wherein heat from an oxidation reaction is transferred for the purpose of heating an inlet stream (paragraph 0079, lines 15-24).

Isogaya et al. teach a process for catalytic gasification of heavy distillate such as a kerosene stream (col. 4, lines 5-10) wherein the temperature of the inlet must be higher than 500°C (col. 5, lines 13-15) for the purpose of preventing the deposition of carbon on the catalyst bed (col. 5, lines 15-17).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide heat from an oxidation reaction transferred to an inlet stream (Wojtowicz et al., paragraph 0079, lines 15-24) in Anumakonda et al. in order to prevent the deposition of carbon on the catalyst bed (Isogaya et al., col. 5, lines 15-17) as taught by Wojtowicz et al. and Isogaya et al.

As to the limitation of the heat exchange fluid in the shell flowing in the same direction of reactant flow in the catalytic partial oxidation reactor tube, Marchand et al. teach a process for converting hydrocarbon into a stream containing hydrogen (paragraph 0001, lines 1-5) wherein a closed vessel having a reformate inlet and a reformate outlet for receiving and discharging, respectively, a reformate stream, and having a coolant inlet and a coolant outlet for receiving and discharging, respectively a coolant fluid stream (coolant fluid stream is heat-exchanger, paragraph 0065) wherein at least one passage of the heat-exchanger extends through at least a portion of the reaction chamber (paragraph 0073, lines 5-8) for the purpose of using the heat supplied by the exothermic oxidation for other parts of the reaction (paragraph 0133).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a closed vessel having a reformate inlet and a reformate outlet for receiving and discharging, respectively, a reformate stream, and having a coolant inlet and a coolant outlet for receiving and discharging, respectively a coolant fluid stream (coolant fluid stream is heat-exchanger, paragraph 0065) wherein at least one passage of the heat-exchanger extends through at least a portion of the reaction chamber (paragraph 0073, lines 5-8) in Anumakonda et al. in order to use the heat supplied by the exothermic oxidation for other parts of the reaction (paragraph 0133) as taught by Marchand et al.

Applicant's arguments filed May 3, 2006 with regard to the rejections of the claims over 35 U.S.C. 103 have been fully considered but they are not persuasive.

Applicant argues that Anumakonda does not teach a method comprising passing a heat exchange fluid past a catalytic partial oxidation reactor in the same direction of reactant flow such that heat from the reactor transfers to the heat exchange fluid.

This argument is not persuasive for the following reason: Anumakonda is not relied upon to teach the limitation of passing a heat exchange fluid past a catalytic partial oxidation reactor in the same direction of reactant flow such that heat from the reactor transfers to the heat exchange fluid. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that Wojtowicz fails to teach transferring heat from a partial oxidation reaction to a heat exchange fluid and teaches away from using partial oxidation throughout its specification.

This argument is not persuasive for the following reason: Wojtowicz is relied upon to teach that it is known to transfer heat from a reactor to the inlet stream. Wojtowicz is not relied upon to teach a partial oxidation reaction. In response to applicant's arguments against the references individually, one cannot show

nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Wojtowicz is not relied upon to teach the advantages or disadvantages of partial oxidation. The teaching relied upon in Wojtowicz is a general teaching that is applicable to exothermic reactions which would advantageously have the inlet pre-heated before entering the reactor. Anumakonda is an exothermic reaction that can be modified in this way. The motivation for this combination stems from the teaching of Isogaya.

Applicant argues that Isogaya teaches away from transferring away from transferring heat from a partial oxidation reactor to lower the reactor temperature.

This argument is not persuasive for the following reason: Isogaya teaches that *inlet* temperature must be maintained at a temperature above 500°C (col. 5, lines 16-20). This disclosure suggests that the *inlet* temperature should be maintained at high enough temperature to prevent carbon deposition. The teaching of Isogaya is combined with Wojtowicz such that Wojtowicz teaches it is known to heat the inlet to a reactor through heat exchange with said reactor. The result is Wojtowicz teaches that something is known (heat exchange between an inlet and a reactor) and Isogaya teaches a motivation for such a heat exchange in a partial oxidation reaction (prevention of carbon deposition).

Applicant argues that Marchand does not disclose or suggest transferring heat from a partial oxidation reaction to a heat exchange fluid.

This argument is not persuasive for the following reason: Marchand is not relied upon to teach a partial oxidation reaction. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Marchand is relied upon to teach that it is known to use heat exchange wherein a closed vessel having a reformate inlet and a reformate outlet for receiving and discharging, respectively, a reformate stream, and having a coolant inlet and a coolant outlet for receiving and discharging, respectively a coolant fluid stream (coolant fluid stream is heat-exchanger, paragraph 0065) wherein at least one passage of the heat-exchanger extends through at least a portion of the reaction chamber (paragraph 0073, lines 5-8) for the purpose of using the heat supplied by the exothermic oxidation for other parts of the reaction (paragraph 0133). The exothermic energy of Marchand and the primary reference due to the conversion of hydrocarbons is the similarity between the two references and the motivation for combination.

Applicant argues that there is no motivation to combine the teachings of Anumakonda, Wojtowicz, Isogaya, and Marchand because Anumakonda teaches maintaining heat within a catalytic partial oxidation reactor and thus teaches away from

passing a heat exchange fluid past a catalytic partial oxidation reactor to transfer heat from the reactor to the heat exchange fluid.

This argument is not persuasive for the following reason: Anumakonda teaches *maintaining* a temperature in a certain range in a catalytic partial oxidation reactor; this range is from 1050°C to 1300°C (col. 10, lines 56-62). Anumakonda then teaches that temperatures above that range are detrimental to the partial oxidation reaction (col. 10, lines 59-64). This teaching suggests that if the temperature would rise above 1300°C, a form of heat reduction would have to be implemented. The references of Wojtowicz, Isogaya, and Marchand teach heat exchange to maintain a temperature of a reactor and heat other parts of the reactor system.

Applicant argues that combination of Anumakonda with Wojtowicz is improper due to the difference in the reactions taking place in the respective references.

This argument is not persuasive for the following reason: Wojtowicz is not relied upon to teach a partial oxidation reaction. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Wojtowicz is relied upon to teach that it is known to heat the inlet to a reactor with heat generated from said reactor wherein a stream comprising hydrogen is obtained from a stream of hydrocarbons. The motivation for combining Wojtowicz and Anumakonda stem from Isogaya.

Applicant argues that the teachings of Wojtowicz and Marchand are in direct contrast to Anumakonda's teachings and that the skilled artisan would not reasonably expect that modification of Anumakonda to incorporate the teachings of Wojtowicz and Marchand would be successful.

This argument is not persuasive for the following reason: This argument is not persuasive for the following reason: Anumakonda teaches *maintaining* a temperature in a certain range in a catalytic partial oxidation reactor; this range is from 1050°C to 1300°C (col. 10, lines 56-62). Anumakonda then teaches that temperatures above that range are detrimental to the partial oxidation reaction (col. 10, lines 59-64). This teaching suggests that if the temperature would rise above 1300°C, a form of heat reduction would have to be implemented. The references of Wojtowicz, Isogaya, and Marchand teach heat exchange in reactions comprising hydrocarbons to maintain a temperature of a reactor and heat other parts of the reactor system.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul A. Wartalowicz whose telephone number is (571) 272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Paul Wartalowicz
June 29, 2006

WAYNE A. LANGEL
PRIMARY EXAMINER